WHAT IS CLAIMED IS:

1. A recombinator device for the re-acidification of an electrolyte stream in a flowing electrolyte zinc-bromine battery, comprising:

- a housing operatively associated with a zinc-bromine battery,
- means for receiving hydrogen from the zinc-bromine battery;
- means for receiving bromine from the zinc-bromine battery;
- means for reacting the hydrogen and bromine together so as to form hydrobromic acid; and
- means for distributing the hydrobromic acid into at least one of an electrolyte stream or electrolyte reservoir of the zinc-bromine battery for re-acidification of same.

2. The device according to Claim 1 wherein the hydrogen receiving means and the bromine receiving means comprise an inlet stream coupling operatively attached to the zinc-bromine battery.

3. The device according to Claim 1 wherein the hydrobromic distribution means comprises an outlet stream coupling operatively attached to at least one of an electrolyte stream or electrolyte reservoir of the zinc-bromine battery.

4. The device according to Claim 1 wherein the reaction means includes a reaction chamber, the device further including:

- means for facilitating the reaction of hydrogen and bromine within the reaction chamber.

5. The device according to Claim 4 wherein the reaction facilitating means comprises a catalyst.

6. The device according to Claim 5 wherein the catalyst comprises a platinized carbon cloth.

7. The device according to Claim 4 wherein the reaction facilitating means comprises means for controlling temperature within the reaction chamber.

8. The device according to Claim 7 wherein the temperature controlling means is in thermal contact with at least a portion of the housing.

9. The device according to Claim 5 further including means for controlling the temperature within the reaction chamber.

10. The device according to Claim 1 further including means for controlling flow of a gas through the housing.

11. The device according to Claim 10 wherein the flow control means comprises positioning of the catalyst in an arrayed spiral configuration within the reaction chamber.

12. The device according to Claim 11 further comprising spacing means positioned between the spirals of the catalyst for facilitating the flow of a gas therethrough.

13. The device according to Claim 10 wherein the flow control means comprises at least a portion of the reaction chamber being constructed from a mesh material.

14. The device according to Claim 1 further including means for controlling delivery of bromine into the reaction chamber.

15. The device according to Claim 14 wherein the delivery control means comprises a capillary operatively associated with the bromine receiving means.

16. The device according to Claim 15 wherein the capillary is sized to deliver one to two drops of aqueous bromine per minute.

17. The device according to Claim 1 wherein the housing further includes an excess aqueous bromine pool region adjacent the hydrobromic acid distribution means.

18. A zinc-bromine battery system comprising

- a zinc-bromine battery having a flowing electrolyte;
- a recombinator device operatively associated with the zinc-bromine battery, wherein the recombinator device comprises:
  - a housing ;
  - means for receiving hydrogen from the zinc-bromine battery;
  - means for receiving bromine from the zinc-bromine battery;
  - means for reacting the hydrogen and bromine together so as to form hydrobromic acid; and
  - means for distributing the hydrobromic acid into at least one of an electrolyte stream or electrolyte reservoir of the zinc-bromine battery for re-acidification of same.

19. A method for re-acidifying an electrolyte in a flowing electrolyte zinc-bromine battery, comprising the steps of:

- introducing an electrolyte stream at least partially comprising aqueous bromine and hydrogen into a reaction chamber;
- reacting the bromine with the hydrogen to create a reaction product;
- reintegrating the reaction product with at least one of an electrolyte stream or an electrolyte reservoir of the zinc-bromine battery for re-acidification of same.

20. The method according to Claim 19 wherein the step of introducing further includes the step of controlling the rate of bromine and hydrogen introduced into the reaction chamber.

21. The method according to Claim 20 wherein the step of controlling comprises the step of allowing one to two drops of the hydrogen and bromine electrolyte stream per minute.

22. The invention according to Claim 18 wherein the method further includes the step of regulating the temperature of the housing, and, in turn, the temperature within the reaction chamber.

23. The method according to Claim 22, wherein the step of regulating the temperature further includes the steps of:

- pre-heating the housing; and
- maintaining the temperature of the housing.

24. The method according to Claim 23, wherein:

- the step of pre-heating comprises the step of adjusting the temperature of the housing to between approximately 100 degrees Celsius and approximately 120 degrees Celsius; and
- the step of maintaining the temperature of the housing comprises the step of maintaining the temperature between approximately 100 degrees Celsius and approximately 120 degrees Celsius.

25. The method according to Claim 18 wherein the step of reintegrating the reaction product further includes the step of removing the reaction product and excess reactant through an output stream.

26. The method according to Claim 18 wherein the step of reacting the aqueous bromine and hydrogen includes the step of associating same with a catalyst.

27. The method according to Claim 26 wherein the catalyst comprises at least one of platinized carbon and heat.

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